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A Revision of the Taiwanese Species of the Family Trogidae (Coleoptera, Scarabaeoidea)

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Abstract The Taiwanese species of the Trogidae is revised. Three new species of the genus *Trox* are described: *Trox taiwanus* sp. nov., *T. tibialis* sp. nov., and *T. yangi* sp. nov. Two species of the genus *Trox*, *T. setifer horiguchii* Ochi et Kawahara and *T. zoufali* Balthasar, and one species of the genus *Omorgus*, *O.* (*Afromorgus*) *costatus* (Wiedemann), are newly recoded from Taiwan. Keys to the genera and species are also given.

The scarabaeoid species of the family Trogidae are called the hide beetles. More than 320 species in four genera are distributed in the world, and about 30 species in two genera occur in East and Southeast Asia. They are 5–20 mm long, and their dorsal surfaces are nearly lusterless and provided with ridges and tubercles. The adults and larvae are among the last scavengers of carcasses of birds, mammals, fish, amphibians and reptiles.

Miwa and Chûjô (1939) listed from Taiwan four *Trox* species, *Trox chinensis* Boheman, 1858, *T. obscurus* Waterhouse, 1875, *T. opacotuberculatus* Motschulsky, 1860, and *T. scaber* (Linné, 1767). Later, Nomura (1973) described *T.* (s. str.) *formosanus* and recorded another species, *T.* (*Omorgus*) *pauliani* Haaf, 1954. The latter is the corrected name of "*Trox chinensis* Boheman" determined by himself in 1937. After the 1970's, there has been no noticeable study on the Taiwanese trogid beetles. On the other hand, Ren (2003) described two new species, *Trox* (s. str.) *gansuensis* and *T.* (s. str.) *placosalinus* from Gansu and Xinjiang, respectively.

Recently, Japanese and Taiwanese specialists of scarabaeoid beetles have had an opportunity to make co-operative study on the coprophagous fauna of Taiwan. Here is the result of an intensive research concerning the family Trogidae.

Before going further, the authors would like to express their gratitude to Dr. Man-Miao YANG, and Mr. Jing-Fu TSAI, National Chung Hsing University, Mr. Hsien-Tzung SHIH, Taiwan Agricultural Research Institute, Ms. Meiling CHANG, National Museum of Natural Science, Taichung, and Mr. Masayuki FUJIOKA, Tokyo, for offering useful materials. They also express their thanks to Dr. REN Guo-Dong and Mr. YUAN Cai-Xia, Hebei University, for sending reprints of papers on the Trogidae from China, and also to Dr. Makoto KIUCHI, Tsukuba City, for taking clear photographs inserted in this paper.

The depository of the holotypes to be designated are given under each description.

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Key to the Genera of the Family Trogidae from Taiwan

1(2) Scutellum simply formed, triangular or subovate (linguiform) in outline. Lateral and basal margins of pronotum fringed with short flattened setae. Antenna with the 2nd segment almost attached to apical portion of scape in ventral view. . . . . Genus *Trox* FABRICIUS, 1775

2(1) Scutellum not simply formed, strongly narrowed near base, polygonal in outline. Lateral and basal margins of pronotum fringed with simple fine setae. Antenna with the 2nd segment clearly attached to a little before apex of scape in ventral view. . . . . Genus *Omorgus* ERICHSON, 1847

Genus *Trox* FABRICIUS, 1775

Key to the Species of the Genus *Trox* from Taiwan*

1(2) Elytral striae each with a distinct fine ridge throughout on each side . . . . . 3.

2(1) Elytral striae without fine ridge throughout on each side . . . . . 7.

3(4) Pronotum with lateral margins not simple, weakly bisinuate in front and behind; elytron with the 1st to 6th striae each distinctly ridged throughout on each side, 7th to 10th not distinctly ridged; all the striae sparsely granulate on each side; male genitalia with exceedingly slender parameres . . . . . *T. taiwanus* sp. nov.

4(3) Pronotum with lateral margins simple, subparallel or gently rounded, at most weakly sinuate before posterior angles . . . . . 5.

5(6) Lateral margin of elytron fringed with distinctly flattened setae throughout; pronotum with lateral margins subparallel; large species, more than 9 mm in length . . . . . *T. setifer horiguchii* OCHI et KAWAHARA.

6(5) Lateral margin of elytron not fringed with distinct flattened setae throughout; pronotum with lateral margins gently rounded in front and slightly sinuate before posterior angles; small species, less than 8 mm in length; male genitalia with parameres bearing deplanate apices ..... *T. zoufali* BALTHASAR.

7(8) Metatibia not so elongate in dorsal view, not distinctly curved outwards before the middle; dorsal outer margin without distinct spinule near the middle; male genitalia with parameres pointed, median lobe with abruptly widened transverse apex, which is sharply toothed on each posterior edge ..... *T. tibialis* sp. nov.

8(7) Metatibia elongate in dorsal view, distinctly curved outwards before the middle in ventral view, dorsal outer margin with a distinct spinule near the middle... ..... 9.

9(10) Head with a distinct small tubercle at the middle of clypeus; pronotum less strongly produced laterad; elytron with odd-numbered intervals with black glabrous areas larger, more distinct, and strongly shining; male genitalia with median lobe almost simple at apex ..... *T. yangi* sp. nov.

10(9) Head with an indistinct small tubercle at the middle; pronotum more strongly produced laterad; elytron with odd-numbered intervals with black glabrous areas smaller and indistinct; median lobe of male genitalia roundly produced at the middle of apex, with a minute rounded accessory tubercle on each side ..... *T. formosanus* Si. NOMURA.

*Judging from the descriptions, the Taiwanese species are not directly related to *Trox* (s. str.) *gansuensis* REN, 2003, and *T.* (s. str.) *placosalinus* REN, 2003.

Trox zoufali BALTHASAR, 1931

(Figs. 1, 8–9)

Trox zoufali BALTHASAR, 1931, Ent. Bl., **27**: 131. —— KIM, 2000, Ins. Korea, Suppl, (11): 12.

Specimen examined. 1 ex. ♂, Hsimakuhsi, 1,550 m alt., Hsinchu Hsien., C. Taiwan, 31–V~1–VI–2000, (by light), C.-L. LI leg.

Distribution. Taiwan [new record], Thailand, Russia, Korea.

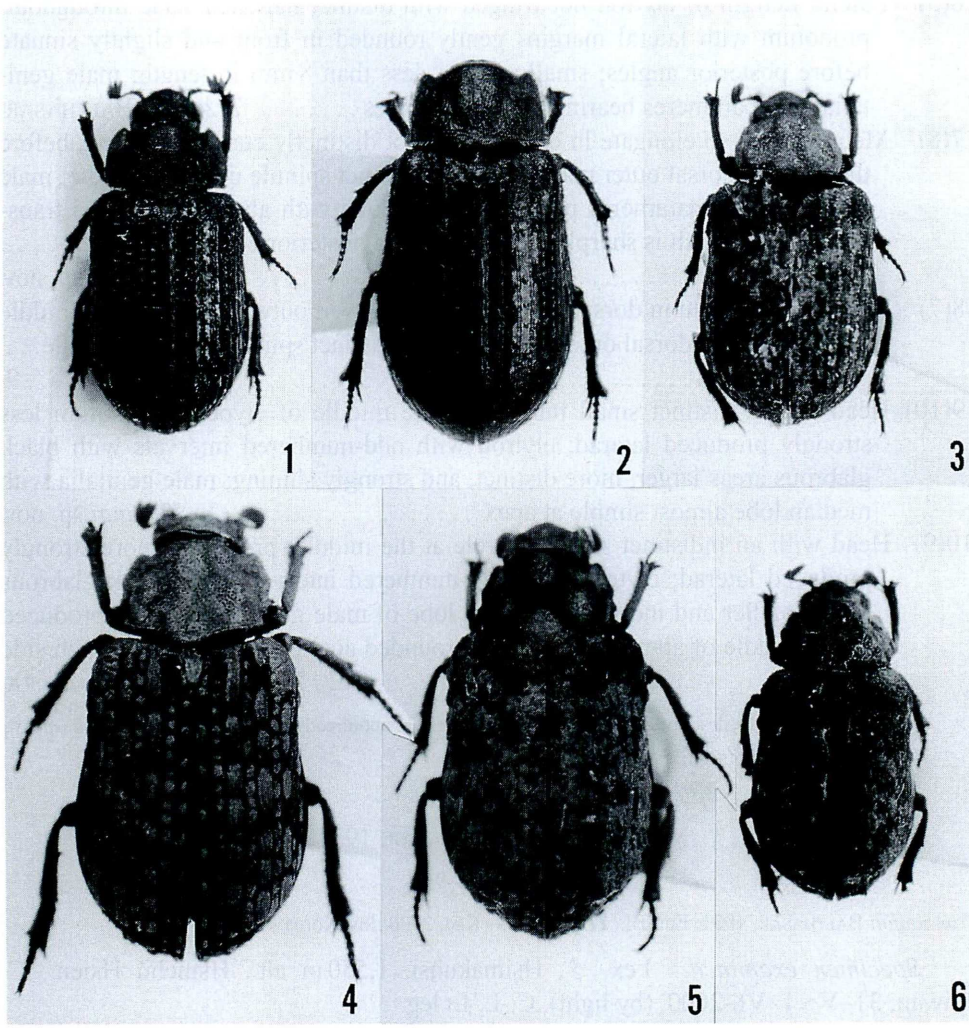
Notes. This species was originally described from Russia. MASUMOTO (1996) recorded it from Thailand. Judging from the male genitalia, this species is a relative of *Trox scaber* (LINNÉ, 1798), a worldwidely distributed species, though external morphological characters are somewhat different from each other.

Trox setifer horiguchii OCHI et KAWAHARA, 2002

(Fig. 2)

Trox setifer horiguchii OCHI et KAWAHARA, 2002, Kogane, Tokyo, (3): 54.

Specimens examined. 1 ex. ♀, Fushan Botanical Garden, Ilan Hsien, Taiwan,



Figs. 1–6. Habitus of Taiwanese *Trox* spp. —— 1, *Trox zoufali* BALTHASAR, ♂; 2, *T. setifer horiguchii* OCHI et KAWAHARA, ♀; 3, *T. taiwanus* sp. nov., holotype, ♂; 4, *T. tibialis* sp. nov., holotype, ♂; 5, *T. yangi* sp. nov., holotype, ♂; 6, *T. formosanus* Si. NOMURA, ♂.

7~8–V–2004, K. MASUMOTO leg.; 1 ex. ♀, Liukuei, Khaohsiung Hsien, S. Taiwan, 23–VI–1984, W.-L. CHEN leg.

Distribution. Taiwan [new record], Japan (Tsushima Is.).

Notes. The nominotypical subspecies of the present species is distributed in Japan and Korea, and the other subspecies, *Trox setifer horiguchii*, is distributed in Tsushima Island. After a close examination of two female specimens collected from Taiwan, the authors have concluded that the Taiwanese species should be classified

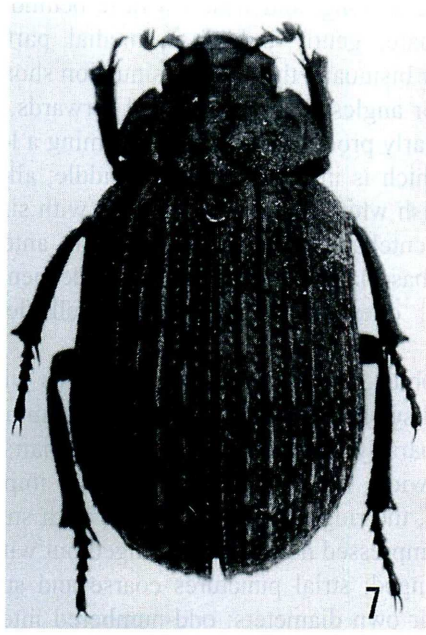


Fig. 7. *Omorgus* (*Afromorgus*) *costatus* (WIEDEMANN), ♂.

into *T. setifer horiguchii*, because they have fine striae on the elytra, the rectangular ocular lobe at the antero-external corner of the head, and four tubercles on the vertex not distinctly raised.

Trox taiwanus sp. nov.

(Figs. 3, 10–11)

Length: 6.0–6.7 mm; width: 3.2–3.4 mm.

Blackish brown, palpi and tarsi reddish-brown, mandibles brownish-black, antennae reddish brown with scape darker and club segments a little paler; each surface covered with earthy velvety secretions except for greater parts of legs. Body oblong-oval and strongly convex.

Male. Head transversely subpentagonal; clypeus triangularly and rather strongly produced forwards, with apex angulate at the middle; frons with median tubercle indistinct (only weakly raised in middle); vertex with four obtuse tubercles in a transverse row, which are mutually separated at equal distance; two outer tubercles a little smaller than the two median ones, and indistinctly continuous with a pair of low elevations just behind antennal insertions; whole margins except posterior one fringed with long fine yellowish-brown hairs. Eyes large, well produced laterad.

Pronotum a little narrower than elytra, wider than long, well convex dorsally,

about 1.30 times as wide as long, and widest a little behind middle; anterior margin widely, weakly emarginate, gently bulged in medial part; lateral margin gently produced laterad, slightly bisinuate, the anterior sinuation shorter than the posterior but slightly stronger; anterior angles sharply produced forwards, posterior angles obtuse; basal margin subtriangularly produced, somewhat forming a lobe in the middle, with a fine marginal furrow, which is interrupted at the middle; all margins except anterior one fringed with yellowish white flattened setae; disc with six concavities surrounded by obtuse ridges: ante-scutellar concavity subtriangular, antero-median one subovate and deepened, a pair of baso-lateral ones rather large, deepened, and well defined, and a pair of antero-lateral ones transverse, not so well defined. Scutellum small, linguiform.

Elytra somewhat robust, about 1.21 times as long as wide, widest at apical 1/3; each humeral callus well swollen and rounded, without a humeral tooth; lateral margin almost smooth, rather sparsely fringed with bent minute hairs; disc with ten punctato-striae, each stria fairly wide, 1st to 6th striae distinctly impressed and finely ridged throughout on each side, the ridge sparsely arranged with small granules, 7th to 10th striae neither distinctly impressed nor distinctly ridged but with rows of small granules which are sparsely arranged; strial punctures coarse and subquadrate, separated by about 1.0–1.5 times their own diameters; odd-numbered intervals well convex, composed of ovate earthy velvety tubercles clothed with short brownish setae, and alternated with glabrous areas; even-numbered intervals not distinctly convex in anterior parts, but convex to the same level as odd-numbered intervals in posterior and lateral parts, composed of small, somewhat round, velvety tubercles with short brownish setae.

Profemur with anterior edge and meso- and metafemora with posterior edge emarginate near each apex. Protibia fairly slender and weakly incurved near the middle, with three lateral teeth, the apical two large and obtuse, bifid, the 3rd very small and a little distant from the 2nd. Mesotibia with dorsal outer edge bearing an indistinct spinule near the middle, metatibia with dorsal outer edge bearing a distinct spinule a little behind the middle.

Aedeagus modified in shape, 1.33 mm in length, 0.41 mm in width, rather strongly curved in lateral view; basal piece short, a half as long as parameres; median lobe subparallel-sided and linguiform in outline, slightly widened anteriad, with three small protuberances apically; parameres conspicuously slender, about 1.0 mm in length, almost parallel-sided in basal halves, then becoming attenuate and incurved, approximate to each other, again outcurved, with digital apices.

Female. Apex of clypeus less produced anteriad; protibia with apical two outer teeth fused with each other and forming a subquadrate projection.

Holotype. ♂, Miaoli Hsien, Shuejian (by rotten meat), C. Taiwan, 29–VI–2003, L.-C. TANG & K.-H. CHUANG leg. (National Museum of Natural Science, Taichung, Taiwan). Paratypes: 1 ex., N. Taiwan: Taoyuan Hsien, Fu-Fu Shan, 121°22′27″E / 24°43′34″N, alt. ca. 1,440 m, by FIT, 20–V～14–VI–2004, C.-L. LI leg.; 1 ex., N.

Taiwan: Taoyuan Hsien, Shih Lin, 121°25′20″E / 24°38′58″N, alt. ca. 1,180 m, by FIT, 1～17–V–2004, C.-L. Li leg.

Notes. The present new species is closely related to *Trox brahminus* Pittino, 1985, from the Malay Peninsula, but can be distinguished from the latter by the following points: 1) elytron with 1st to 6th striae distinctly ridged throughout on each side; 2) pronotum clearly narrower than elytra, with lateral margin bisinuate (wide with trisinuate lateral margin in *T. brahminus*); 3) all the legs slenderer, especially protibiae fairly so and weakly incurved near the middle (obviously robust, with protibia not distinctly incurved near the middle in *T. brahminus*); 4) pronotum with shallower six concavities; 5) male genitalia with median lobe only slightly widened near apex with three protuberances apically (distinctly narrowed near the middle, abruptly widened near the apex, and forming a subtarapezoidal lobe in *T. brahminus*).

Trox tibialis sp. nov.

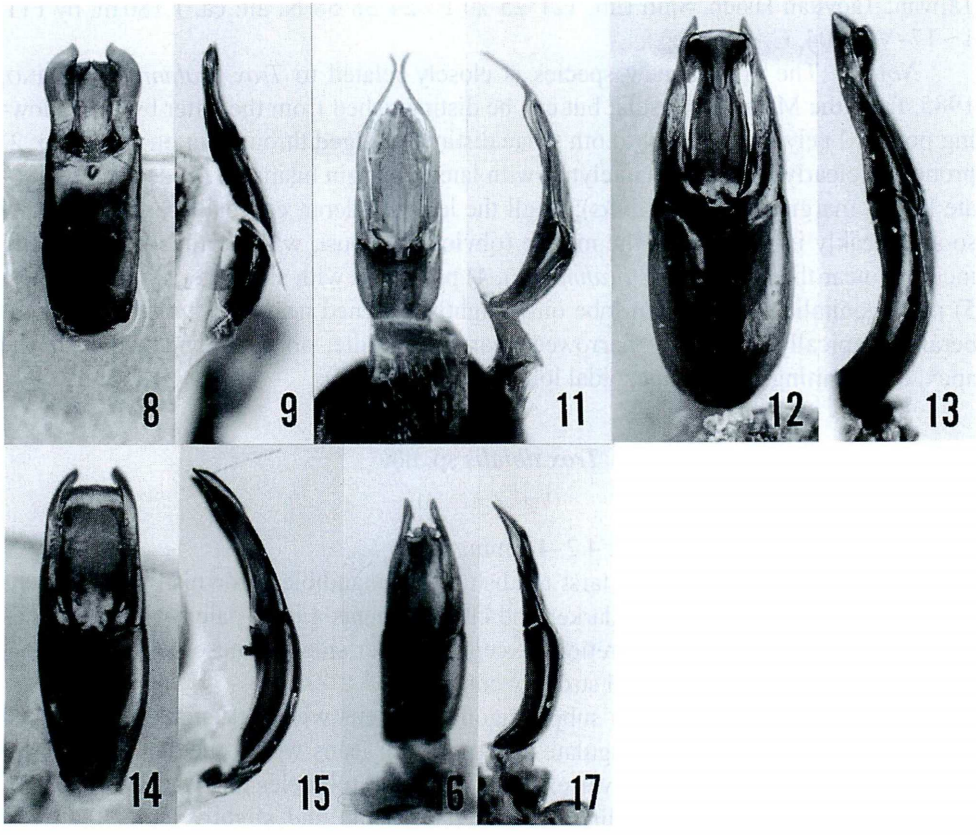
(Figs. 4, 12–13)

Length: 7.3–8.5 mm; width: 4.2–4.4 mm.

Blackish brown, palpi and tarsi reddish black, mandibles brownish black, antennae reddish brown with scapes darker and club segments a little paler; whole surfaces covered with earthy velvety secretions except for inner sides of meso- and metatibiae, tarsi, etc. Body oblong-ovate and strongly convex.

Male. Head transversely subpentagonal; clypeus widely triangularly produced forwards, with apex obtusely angulate at the middle; frons with a median tubercle indistinct (only raised in middle); vertex with four small tubercles in a transverse row, of which two median ones are a little separated mutually and slightly larger than two outer tubercles, which are continuous with a pair of low longitudinal elevations arising from just behind antennal insertions; whole margins except posterior one fringed with long fine yellowish brown hairs. Eyes relatively large though not so strongly produced laterad.

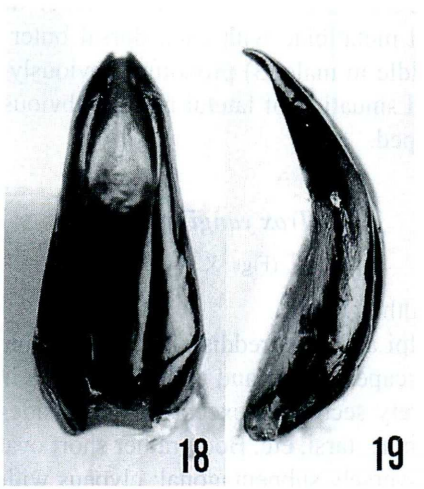
Pronotum obviously narrower than elytra, well convex dorsad, about 1.36 times as wide as long, widest a little behind the middle; anterior margin widely emarginate, nearly straight widely in middle; lateral margin rather strongly produced laterad, particularly in anterior parts, trisinuate, the basal sinuation shortest but rather strong and located before posterior angle, the median one slightly weaker than the basal one, and the apical one the longest but weakest; anterior angles sharp, well produced anteriad; posterior angles distinct and gently produced laterad; basal margin widely and subtriangularly produced, forming a slight lobe at the middle, with a fine marginal furrow, which is interrupted at the middle; lateral and basal margins fringed with pale flattened setae; disc with six concavities surrounded by obtuse ridges: ante-scutellar concavity subrhombic, antero-median one ovate, a pair of baso-lateral ones rather large and somewhat comma-shaped, and a pair of antero-lateral ones rather transverse. Scutellum medium-sized, linguiform, feebly concave in medio-basal part.



Figs. 8–17. Male genitalia of *Trox* spp. —— 8–9, *Trox zoufali* BALTHASAR, 8, dorsal view, 9, lateral view; 10–11, *T. taiwanus* sp. nov., 10, dorsal view, 11, lateral view; 12–13, *T. tibialis* sp. nov., 12, dorsal view, 13, lateral view; 14–15, *T. yangi* sp. nov., 14, dorsal view, 15, lateral view; 16–17, *T. formosanus* Si. NOMURA, 16, dorsal view, 17, lateral view.

Elytra subovate, about 1.23 times as long as wide, widest a little behind the middle; each humeral callus well convex and rounded, without humeral tooth; lateral margin almost smooth, fringed with very minute bent hairs; disc with ten punctato-striae, each stria neither distinctly impressed nor finely ridged throughout on each side; strial punctures more or less coarse, separated by 0.8–1.8 times their own diameters; odd-numbered intervals well convex, composed of ovate to elongate earthy velvety tubercles alternated with short, black, glabrous areas, the tubercles clothed with short brownish setae; even-numbered intervals lower than odd-numbered ones, and also composed of round to ovate small earthy velvety tubercles, alternated with short black glabrous areas.

Profemur with anterior edge strongly emarginate near apex, mesofemur with posterior edge moderately but obviously emarginate near apex, metafemur with posterior



Figs. 18–19. Male genitalia of *Omorgus* (*Afromorgus*) *costatus* (WIEDEMANN), 18, dorsal view, 19, lateral view.

edge weakly so near apex. Protibia with three outer teeth: 1st and 2nd teeth strong, located at the apical part of protibia, 3rd small and lying a little distant from the 2nd. Meso- and metatibiae a little slenderer than in related species, without strong spinule at the middle of the dorsal outer edge, metatibia obviously curved outwards in apical part.

Aedeagus oblong-ovate in dorsal view, 1.96 mm in length, 0.63 mm in width, weakly curved in lateral view; basal piece slightly longer than parameres in lateral view; median lobe gently narrowed towards apex in basal 4/5, then abruptly widened into a broad lobe whose posterior edge bears a sharp spine on each side; parameres longer than median lobe, about 1 mm in length, densely punctate in apical halves, and somewhat twisted near apices, which are rather spatulate in lateral view.

Female. As compared with male, clypeus less angulate in front; middle sinuation of pronotal lateral margin obviously weaker, mesotibia with a small spinule at the middle of the dorsal outer edge.

Holotype: ♂, Shuejian, Miaoli Hsien, C. Taiwan, by rotten meat, 29–VI–2002, L.-C. TANG leg. (National Museum of Natural Science, Taichung, Taiwan). Paratypes: 1 ex., N. Taiwan: Taoyuan Hsien, Ming Chi, 121°27′35″E / 24°38′43″N, alt. ca. 1,020 m, by FIT, 20–V~14–VI–2004, C.-L. LI leg.; 1 ex., N. Taiwan: Taoyuan Hsien, Fu-Fu Shan, 121°22′27″E / 24°43′34″N, alt. ca. 1,440 m, by FIT, 20–V~14–VI–2004, C.-L. LI leg.; 1 ex., N. Taiwan: Ilan Hsien, 17 km, 100 Logging Rd., 121° 24′15″E / 24°34′40″N, alt. ca. 1,700 m, by FIT, 1~17–V–2004, C.-L. LI leg.; 1 ex., Ilan Hsien, Yuang-Yan Hu, alt. 1,700 m, 20~29–IV–2004, no collector's name.

Notes. The present new species is somewhat related to *Trox formosanus* NOMURA, 1973, from Taiwan, but can be distinguished from the latter by the following

points: 1) meso- and metatibiae clearly longer, the latter distinctly curved outwards near apex; 2) meso- and metatibiae with each dorsal outer edge devoid of a strong lateral spinule at the middle in male; 3) pronotum obviously narrower, with sides less produced laterad, the 2nd sinuation of lateral margin obviously smaller; 4) male genitalia quite differently shaped.

Trox yangi sp. nov.

(Figs. 5, 14–15)

Length: 7.6 mm; width: 4.0 mm.

Blackish brown, palpi and tarsi reddish black, mandibles brownish black, antennae reddish brown with scapes darker and club segments a little paler; whole surfaces covered with earthy velvety secretions except for inner sides of protibiae, dorsal surface of meso- and metatibiae, tarsi, etc. Body rather short ovate and strongly convex.

Male. Head transversely subpentagonal; clypeus widely, triangularly produced forwards, with apex obtusely angulate at the middle; frons with a small round tubercle, which is more distinct than in the related species; vertex with four small tubercles in a transverse row, all of which are almost of the same size, the outer two being continuous with low elevations lying just behind antennal insertions; whole margins except posterior one fringed with long fine yellowish brown hairs. Eyes large, rather strongly produced laterad, and well visible from above.

Pronotum obviously narrower than elytra, about 1.30 times as wide as long, widest a little behind the middle, well convex; anterior margin widely emarginate, gently bulged in middle; lateral margin gently produced laterad, trisinuate, the basal sinuation strongest and located just before posterior angle, the median one slightly weaker and shorter than the basal one, and the apical one the weakest but longest; anterior angles sharp, well produced forwards, posterior angles distinct though obtuse and not so produced laterad; lateral margins with 2nd flange well produced laterad; basal margin widely and subtriangularly produced, forming a weak lobe in the middle, with a fine marginal furrow which becomes obsolete in the middle; lateral and basal margins fringed with pale yellowish flattened setae; disc with six concavities surrounded by fairly strongly elevated obtuse ridges: ante-scutellar concavity subrhombic, antero-median one subovate, a pair of baso-lateral ones rather large and a little deepened, and a pair of antero-lateral ones rather transverse. Scutellum medium-sized, lingulate.

Elytra rather short, about 1.22 times as long as wide, widest at the middle; each humeral callus well swelling and rounded, humeral tooth missing; lateral margin almost smooth, sparsely fringed with very minute bent hairs; disc with ten punctato-striae, each stria neither distinctly impressed nor finely ridged throughout on each side; strial punctures not so coarse, separated by about 0.3 to 1.2 times their own diameters; odd-numbered intervals well convex, composed of ovate to elongate-ovate earthy velvety tubercles alternated with rather large, black, polished areas, the tubercles clothed with short brownish setae; even-numbered intervals not so convex, and also composed

of round to ovate small, earthy velvety tubercles.

Profemur with anterior edge weakly emarginate near apex; mesofemur with posterior edge rather strongly emarginate near apex, metafemur with posterior edge also strongly emarginate near apex. Protibia with three outer teeth, 1st and 2nd teeth strong though bifid at base, 3rd small, lying a short distance from the 2nd. Meso- and metatibiae with dorsal outer edge bearing a strong spinule near the middle, that of the latter located a little behind the middle.

Aedeagus about 1.65 mm in length, 0.47 mm in width, subovate in dorsal view, rather strongly curved in lateral view; basal piece slightly shorter than parameres; median lobe nearly simple on dorsal surface, with lateral margins subparallel in basal parts, notched at apical 1/4, and also notched at apical 1/8; parameres distinctly longer than median lobe, about 0.9 mm in length, basal portion slightly wider than median lobe in dorsal view, apical part becoming a little tumid interiad, and acuminate apicad.

Female. Clypeus not angulate; protibia with apical two teeth not sharp, end spur finer and simply acute.

Holotype. ♂, N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 14–I–2003, by FIT, C.-L. Li leg. (Department of Entomology, National Taiwan University). Paratypes: 3 exs., same data as for the holotype; 9 exs., N. Taiwan: Taoyuan Hsien, Fu-Fu Shan, 121°22′27″E / 24°43′34″N, ca. 1,440 m alt., by FIT, 1~17–V–2004, C.-L. Li leg.; 9 exs., N. Taiwan: Taoyuan Hsien, Fu-Fu Shan, 121°22′27″E / 24°43′34″N, ca. 1,440 m alt., by FIT, 20–V~14–VI–2004, C.-L. Li leg.; 13 exs., N. Taiwan: Taoyuan Hsien, Shih Lin, 121°25′20″E / 24°38′58″N, ca. 1,180 m alt., by FIT, 1~17–V–2004, C.-L. Li leg.; 16 exs., N. Taiwan: Taoyuan Hsien, Shih Lin, 121°25′20″E / 24°38′58″N, ca. 1,180 m alt., by FIT, 20–V~14–VI–2004, C.-L. Li leg.; 4 exs., N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 7–IV–2003, by FIT, C.-L. Li leg.; 1 ex., N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 6–XII–2002, by FIT, C.-L. Li leg.; 2 exs., N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 24–IV–2003, by FIT, C.-L. Li leg.; 1 ex., N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 1–XI–2002, by FIT, C.-L. Li leg.; 1 ex., N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 6–I–2003, by FIT, C.-L. Li leg.; 3 exs., N. Taiwan: Taipei Hsien. Nei Don Logging Road, ca. 850 m alt., 18–XII–2002, by FIT, C.-L. Li leg.; 2 exs., N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 29–X–2002, by FIT, C.-L. Li leg.; 3 exs., N. Taiwan: Taipei Hsien. Nei Don Logging Road, ca. 850 m alt., 3–XII–2003, by FIT, C.-L. Li leg.; 2 exs., N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 24–XII–2003, by FIT, C.-L. Li leg.; 2 exs., N. Taiwan: Taipei Hsien, Nei Don Logging Road, ca. 850 m alt., 18–IV–2003, by FIT, C.-L. Li leg.; 1 ex., N. Taiwan: Taoyuan Hsien., Ming Chi, 121°27′35″E / 24°38′43″N, ca. 1,020 m alt., 14–I–2003, by FIT, C.-L. Li leg.; 1 ex., Taiwan: Miaoli Hsien, Shuejian, (rotten meat), 29–VI–2002, L.-C. Tang leg. (NCHU); 1 ex., Fushan Botanical Garden, Ilan Hsien, 7~8–V–2004, K. Masumoto leg. (National Science Museum (Nat. Hist.), Tokyo).

Notes. The present new species is closely related to *T. formosanus* Nomura,

1973, but can be distinguished from it by the following points: 1) pronotum with the basal sinuation of lateral margin obviously larger and stronger than the median one (slightly stronger but not obviously larger than the median one in *T. formosanus*); 2) median tubercle on clypeus fairly large and distinct (smaller and indistinct in *T. formosanus*); 3) elytron with odd-numbered intervals with black glabrous areas large and very shiny, whereas in *T. formosanus*, the black glabrous areas are smaller and weakly shiny; 4) male genitalia with differently shaped median lobe.

The specific name is given in honor of Prof. Dr. Ping-Shih YANG, National Taiwan University, who is the adviser of one of the present authors.

Trox formosanus Si. NOMURA, 1973

(Figs. 6, 16–17)

Trox formosanus Si. NOMURA, 1973, Ent. Rev. Japan, Osaka, **25**: 37. —— MASUMOTO, 1976, Elytra, Tokyo, **3**: 2. —— KIM, 2000, Ins. Korea, Suppl., 11: 38.

Specimens examined. 1 ex. ♂, Musha (Wushe), Taiwan, 31–III–1970, T. KOBAYASHI leg. (holotype preserved in NSMT); ♀, Rushan (Lushan), Nantou Hsien, C. Taiwan, V–1979, Y. KIYOYAMA leg.

Distribution. Taiwan, Korea.

Notes. One of the most distinct characters of this species might be the male genitalia with the median lobe roundly produced at the middle of apex, with a minute rounded accessory tubercle on each side. In the figure drawn by NOMURA (1973, p. 38) in the original description, those accessories are omitted.

The population from North Taiwan (*e.g.*, Taipei) are a little smaller than those from Central Taiwan (*e.g.*, Wushe) in body size, and their male genitalia are slightly slenderer, with the median lobe more narrowly produced at the middle of apex. They might be diverged to a subspecies rank.

Incertae sedis

MIWA and CHÛJÔ (1939) listed the following species in their catalogue, but the authors believe that they should be excluded from the fauna of Taiwan. The specimens used for the data of the present catalogue are preserved in the collection of the Taiwan Agricultural Research Institute, Wufeng, but they seemed to be dubious materials.

Trox opacotuberculatus MOTSCHULSKY, 1860

Trox opacotuberculatus MOTSCHULSKY, 1860, Étud. ent., **9**: 14. —— MIWA & CHÛJÔ, 1939, Cat. Coleopt. Japon., Scarabaeidae, (5): 29.

Trox scaber (LINNÉ, 1767)

Scarabaeus scaber LINNÉ, 1767, Syst. Nat., ed. 12, 573. —— MIWA & CHÛJÔ, 1939, Cat. Coleopt. Japon.,

Scarabaeidae, (5): 29.

Genus *Omorgus* ERICHSON, 1847

Subgenus *Afromorgus* SCHOLTZ, 1986

According to SCHOLTZ (1986 a, p. 361), all the African and Oriental species of the genus *Omorgus* belong to this subgenus. In the male genitalia, species of this subgenus possess complicatedly formed median lobes with ridges, knobs, and foveae, and also possess large and dorsally fused pars basalis. Three species of the genus *Omorgus* known from Taiwan have such characteristics.

Key to the Taiwanese Species of the Genus *Omorgus*

1(2) Pronotum with lateral margins neither broadly rounded nor subangulate in front; anterior angles strongly produced forwards, not very obtuse; posterior angles distinct, not rounded; elytra with intervals not bearing black glabrous glossy areas. . . . . *O.* (*A.*) *costatus* WIEDEMANN.

2(1) Pronotum with lateral margins broadly rounded or subangulate in front; anterior angle not strongly produced forwards, very obtuse; posterior angle not distinct, rounded; elytra with intervals bearing some small black glabrous glossy areas . . . . . 3.

3(4) Protibia with lateral margin not simple, bearing a distinct tooth near the middle; head with a pair of contiguous tubercles at the middle; pronotum with basal margin rounded in the middle . . . . . *O.* (*A.*) *chinensis* BOHEMAN.

4(3) Protibia with lateral margin simple, not bearing a distinct tooth near the middle; head with a pair of well separated tubercles at the middle; pronotum with basal margin obtusely angulate at the middle . . . . . *O.* (*A.*) *pauliani* HAAF.

Omorgus (*Afromorgus*) *costatus* WIEDEMANN, 1823

(Figs. 7, 18–19)

Trox costatus WIEDEMANN, 1823, Zool. Mag. Altona, **2**: 30. —— HAAF, 1954, Ent. Arb., Mus. Frey, **5**: 390. —— SCHOLTZ, 1986, Austral. J. Zool., **125**: 36.

Specimen examined. 1 ex. ♂, Taitung, E. Taiwan, 25–V–1998, M. FUJIOKA coll.

Distribution. Taiwan [new record], Hainan Is., Thailand, Vietnam, Malay Peninsula, Borneo, Sumatra, Sulawesi, Philippines, Papua New Guinea, Solomon Isls., Australia.

Notes. This species is widely distributed from Southeast Asia to Australia. Taiwan is one of the northernmost records as to this species.

Omorgus (*Afromorgus*) *chinensis* (BOHEMAN, 1858)

Trox chinensis BOHEMAN, 1858, Freg. Eugen. Resa, Stockholm, **1858**: 52. —— MASUMOTO, 1976, Elytra, Tokyo, **3**: 1.

Trox obscurus WATERHOUSE, 1875, Trans. ent. Soc. London, **1875**: 98.— MIWA & CHÛJÔ, 1939, Cat. Coleopt. Japon., Scarabaeidae, (5): 29.

Distribution. Japan (Honshu, Izu Isls., Shikoku, Kyushu), Taiwan, China, Indochina, Malay Peninsula, Sumatra, Java.

Notes. This species is also widely distributed in Southeast Asia. Although the authors have had no opportunity of examining the materials, this species is presumably distributed in Taiwan.

Omorgus (Afromorgus) pauliani HAAF, 1954

Trox pauliani HAAF, 1954, Ent. Arb. Mus. Frey, Tutzing, **5**: 385.

Trox (*Omorgus*) *pauliani*: Si. NOMURA, 1973, Ent. Rev. Japan, Osaka, **25**: 45. —— MASUMOTO, 1976, Elytra, Tokyo, **3**: 1.

Specimen examined. 1 ex., Kenting Park, Pingtung Hsien, S. Taiwan, at light, 24–VI–1940, T. KURODA leg.

Distribution. Indochina, Sri Lanka, Taiwan.

Notes. MIWA and CHÛJÔ (1939) listed from Taiwan "*Trox chinensis* BOHEMAN, 1858" together with "*Trox obscurus* WATERHOUSE, 1875," but one of these should be *O. pauliani*.

要　　約

益本仁雄・越智輝雄・李　春霖：台湾産コブスジコガネ科の種の検討．—— 台湾産コブスジコガネ科について検討した．MIWA & CHÛJÔ (1939q) はコブスジコガネ属を4種，台湾から記録した．一方，野村 (1937) は *Trox chinensis* BOHEMAN を報告し，さらに NOMURA (1973) は *T.* (s. str.) *formosanus* を記載し，同時に前種を *T.* (*Omorgus*) *pauliani* HAAF と訂正した．その後，今日までこの科の種について検討されていなかった．筆者らは，既存の台湾産標本に加え，新規に追加採集された標本も併せて検討した．その結果，この地区にはコブスジコガネ属の *Trox formosanus* NOMURA のほかに *Trox setifer horiguchii* OCHI et KAWAHARA および *Trox zoufali* BALTHASAR（いずれも新分布記録）に加え，3新種 *Trox taiwanus* sp. nov., *T. tibialis* sp. nov., *T. yangi* sp. nov. が分布しており，さらにオオコブスジコガネ属では *Omorgus* (*Afromorgus*) *chinensis* (BOHEMAN) および *O.* (*A.*) *pauliani* HAAF のほかに，*O.* (*A.*) *costatus* (WIEDEMANN)（新分布記録）の分布していることがわかった．

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